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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/891,795	06/25/2001	Bin Zhao	12569-04/NEC	1464

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EXAMINER

CURTIS, CRAIG

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 09/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/891,795	Applicant(s) ZHAO
	Examiner Craig Curtis	Art Unit 2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on Jun 25, 2001
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-23 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are a) accepted or b) objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner. If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) The translation of the foreign language provisional application has been received.

- 15) Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s). 3
- 4) Interview Summary (PTO-413) Paper No(s). _____
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

I. Claims 8, 9, 11, 16, and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The meaning of the recitations "*equivalent* angular orientation" (claim 1, lines 2-4, 11, and 12; claim 9, lines 3, 5, and 7; and claim 11, lines 3, 5) and "*equivalent* angle of the birefringent element assembly" (claim 16, line 3-4) cannot be ascertained. More specifically, the first use of the modifier "*equivalent*" in claims 8, 9, and 11 renders these claims indefinite in that one is unable to discern to which angular orientation associated with claim 1 such angular orientations are to be considered "*equivalent*" (there being no angular orientation limitation expressly recited in claim 1). Moreover, unless the subsequently recited angular orientations are to be taken as being equal, it is unclear how distinct angular orientations can be considered as being "*equivalent*." This misdescription becomes even more problematic when, as in claim 9, said first, second, and third birefringent elements, respectively, are identified as having "*equivalent*" angular orientations of 45°, -21°, and 7°.

Applicant's qualification (recited in claim 8, lines 11, 12) that "...the equivalent angular orientations are with respect to an *equivalent* polarization direction of light entering the birefringent element assembly." does not help to clarify the matter (not least because claim 9 depends from claim 1, not claim 8). Being unable to discern precisely to what said "*equivalent* polarization direction of light entering the birefringent element assembly" is "*equivalent*," the examiner merely suggests that applicant consider using the word "relative" in place of most of the other recitations of "*equivalent*" in the above-identified claims,

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as well as unambiguously identity that to which said equivalent angular orientations are to be considered "equivalent."

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

2. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 1-7, 10, and 12-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Tai et al. (6,301,046).

Tai et al. disclose (with exclusive reference to Fig. 4a) the invention as claimed--An interleaver and methods for interleaving/achieving a birefringent effect comprising:

a birefringent element assembly (400, 492, 495) comprising at least one spatial birefringent element (402), the birefringent element assembly providing two output components (see figure); and

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a reflector configured to direct the two components from the birefringent element assembly back through the birefringent element assembly (472);

further comprising a polarization rotator (470) configured to make the two components approximately the same in polarization with respect to one another prior to the two components being transmitted back through the birefringent element assembly;

wherein the reflector comprises a prism or mirror (Tai et al. teaches both a prism and a mirror: elements 450 and 472, respectively);

wherein the polarization rotator comprises a half-wave waveplate (470: col. 7, ll. 20-21);

wherein the reflector comprises a mirror and a quarter-wave waveplate (472: col. 9, ll. 56-59);

wherein the birefringent element assembly comprises a plurality of spatial birefringent elements (400, 490, 492);

wherein the birefringent element assembly and the reflector are configured so as to facilitate interleaving of a plurality of input light beams simultaneously (see 404, in multiplexed mode);

wherein each spatial birefringent element defines two light paths (see figure), each light path having a different optical path length (inherent, given the refractive index difference between the ordinary and extraordinary beams) and wherein a difference in optical path length between the two paths is provided by a material having an index of refraction greater than one (inherent) which is disposed within at least a portion of one of the first and second paths;

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 8, 9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tai et al. (6,301,046) in view of Leyva et al. (6,421,177).

Tai et al. disclose the invention as set forth above EXCEPT FOR explicit teachings of the following: wherein said birefringent element assembly comprises a first birefringent element having an equivalent angular orientation of ϕ_1 , a second birefringent element having an equivalent angular orientation of ϕ_2 , and a third birefringent element having an equivalent angular orientation of ϕ_3 ; wherein an order of the first birefringent element, second birefringent element, and third birefringent element is selected from the group consisting of:

first birefringent element, second birefringent element, third birefringent element;

third birefringent element, second birefringent element, first birefringent element; and

wherein the equivalent angular orientations are with respect to an equivalent polarization direction of light entering the birefringent element assembly;

wherein a first birefringent element having an equivalent angular orientation of 45^0 and having a phase delay of Γ ;

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a second birefringent element having an equivalent angular orientation of -21^0 and having a phase delay of 2Γ ; and

a third birefringent element having an equivalent angular orientation of 7^0 and having a phase delay of 2Γ .

Leyva et al., however, teach (see col. 5, II. 62-67--col. 6, II. 1-18) a birefringent element assembly comprising a first birefringent element having an equivalent angular orientation of φ_1 , a second birefringent element having an equivalent angular orientation of φ_2 , and a third birefringent element having an equivalent angular orientation of φ_3 ;

wherein an order of the first birefringent element, second birefringent element, and third birefringent element is selected from the group consisting of:

first birefringent element, second birefringent element, third birefringent element (in this order);

third birefringent element, second birefringent element, first birefringent element; and

wherein the equivalent angular orientations are with respect to an equivalent polarization direction of light entering the birefringent element assembly;

wherein a first birefringent element having an equivalent angular orientation of 45^0 (see col. 6, II. 2-3) and having a phase delay of Γ (inherent);

a second birefringent element having an equivalent angular orientation of -14.8^0 and having a phase delay of 2Γ ($2L = >$ inherent); and

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a third birefringent element having an equivalent angular orientation of 10^0 and having a phase delay of 2Γ ($2L = >$ inherent).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the invention of Tai et al. such that the additional birefringent elements taught by Leyva et al. replace element 402 of the birefringent element assembly, and, further, to have adjusted (prior to or after the replacement of element 402 by the additional birefringent elements of Leyva et al.) said orientations of said second and third birefringent elements to be -21^0 and 7^0 , respectively, for at least the purpose of allowing the passband of the interleaving filter to be flattened to a selectable degree, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

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Contact Information

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig Curtis, whose telephone number is (703) 305-0776. The facsimile phone number for Art Unit 2872 is (703) 308-7721.

Any inquiry of a general nature regarding the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0956.



Cassandra Spyrou
Supervisory Patent Examiner
Technology Center 2800



Craig H. Curtis
Group Art Unit 2872
5 September 2002